Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of:	)	
	)	
Bridging the Digital Divide for Low-Income Consumers	)	WC Docket No. 17-287
	)	
Lifeline and Link Up Reform and Modernization	)	WC Docket No. 11-42
	)	
Telecommunications Carriers Eligible for Universal Service Support	)	WC Docket No. 09-197

REPLY COMMENTS OF DANIEL LYONS, ASSOCIATE PROFESSOR OF LAW, BOSTON COLLEGE LAW SCHOOL

I respectfully submit these comments in response to the Notice of Proposed Rulemaking ("NPRM") adopted in the above-captioned proceeding. I am an Associate Professor of Law (with tenure) at Boston College Law School, where for the past nine years I have taught and researched in the fields of telecommunications and administrative law.

I applaud the Commission's desire to improve the Lifeline program. I particularly commend the efforts the Commission proposes to enable consumer choice, by increasing the flexibility of the minimum service standard and eliminating the equipment requirement. The purpose of Lifeline should be to increase the purchasing power of qualified low-income households, to allow them to participate like any other consumer in the market for telecommunications services. By reducing the limitations on the program and increasing the options available for Lifeline households, the proposed rule moves the program closer to a market-based solution to connecting unconnected households.

For the same reason, I oppose the Commission's proposed ban on including resellers within the Lifeline program. According to the NPRM, the Commission's purpose is to steer Lifeline funds toward facilities-based providers, as a means of promoting broadband investment.

The Commission's instinct to promote broadband investment is unquestionably correct. But Lifeline is not the vehicle to pursue this worthy goal. The Universal Service Program has other programs dedicated to building and maintaining broadband networks, such as the Connect America Fund (whose annual cost far exceeds that of Lifeline). Lifeline has a different mission: to make sure that America's most vulnerable populations are not left on the wrong side of the digital divide. This proposal harms that mission.

First, the reseller ban restricts choice and ignores the preferences of Lifeline consumers. Almost 70 percent of Lifeline recipients currently purchase service from resellers, not facilities-based providers. In other words, the revealed preferences of Lifeline households indicate that resellers are better at serving this segment. By removing competitors from the marketplace, the proposal would limit the options available to Lifeline families — families that already have few options because of limited purchasing power — and bind them to providers that most of them would not choose voluntarily. At a minimum, the ban would be disruptive and burdensome to Lifeline consumers, the vast majority of which would be required to leave their current provider.

More fundamentally, the reseller ban ignores the role that wireless substitution plays in low-income communities. The Centers for Disease Control reports that 67.5 percent of households below the poverty line have eliminated landline service and rely solely on wireless service for voice communication (compared to only 52.5 percent of total US households). And the statistics are similar for broadband: The Pew Research Center notes that 21 percent of households earning less than $20,000 per year have a smartphone but no home broadband service for internet access, compared to only 6 percent of homes earning over $100,000 per year. Because of greater risks to housing and employment, poor families are more susceptible to

involuntary moves. In that environment, mobility provides stability and helps keep these families connected during times of disruption.

Perhaps unsurprisingly, the overwhelming majority—89 percent –of Lifeline dollars are spent on wireless, not wired, plans. And most of these plans are provided by resellers. Sprint is the only facilities-based provider to offer Lifeline in most areas (and it opposes the reseller ban). Most other facilities-based providers provide Lifeline in only a handful of states, and some intend to exit the program. TracFone's comments show that without resellers, most Lifeline recipients' wireless options would be minimal, which limits their ability to take advantage of the unique advantages that wireless substitution offers to this vulnerable population.

I have long argued that Lifeline is a flawed program in need of fundamental reform. But these reforms should enhance the purchasing power of eligible households, as the proposals to enable consumer choice would. A true market-based subsidy would allow these households, as much as possible, to participate like any other family in the marketplace for telecommunications services. The reseller ban instead limits Lifeline recipients' options and relegates many to wired solutions when most Americans, including many low-income families, prefer the advantages of mobile connectivity. There are better ways to promote build-out and limit abuse without limiting the options of families that have few choices to begin with.

To the extent that the Commission is interested in more comprehensive proposals to restructure the Lifeline program and reduce its current inefficiencies, I attach a white paper that I wrote for the American Enterprise Institute focusing on reforms, which I incorporate by reference herein.

Respectfully submitted,

___/s/_____

16 March 2018

Daniel A. Lyons
Boston College Law School
885 Centre Street
Newton, MA 02459

To Narrow the Digital Divide, the FCC Should Not Simply Extend Lifeline to Broadband

By Daniel A. Lyons

March 2016

KEY POINTS

- *As more activities move online, it is becoming increasingly important to narrow the digital divide by helping those who cannot afford Internet access.*
- *The FCC's $2.25 billion proposal to expand the Lifeline telephone assistance program into a monthly broadband subsidy is unlikely to narrow the digital divide.*
- *Congress should adopt a comprehensive approach that encompasses digital literacy outreach programs and low-cost equipment plans as well as monthly service plan subsidies.*

Universal service has long been an integral component of American telecommunications policy—and rightly so. As more activities move online, it becomes increasingly important to narrow the digital divide by helping those who cannot afford Internet access to get onto the network.

Regrettably, the proposal from the Federal Communications Commission (FCC) to expand Lifeline is unlikely to help solve this problem. The agency proposes to spend $2.25 billion annually to transform a Reagan-era telephone assistance program into a broadband subsidy. Yet when prompted by the GAO, the agency admitted it has no proof that the existing subsidy of $9.25 monthly per household meaningfully increases telephone penetration rates, and independent academic studies suggest that as much as 88 percent of program funding is wasted each year.

Now the FCC proposes to extend the same monthly subsidy to broadband access, but it offers no plan to limit the proposed subsidy to households that otherwise would not purchase Internet access and no proof that an extra $9.25 each month would entice those households to buy Internet access. Its definition of qualifying broadband service is inconsistent with earlier agency rulings, and its desire to phase out telephone support is unnecessarily paternalistic. The proposal would increase Lifeline expenditures by 50 percent without addressing serious structural flaws in the existing program, such as runaway costs and an unsustainable funding mechanism. Even if it passes, a broadband Lifeline program does nothing to address other, potentially more significant barriers to Internet adoption, such as low interest in buying household Internet access and the high cost of computers. The FCC's proposal amounts to a $2.25 billion annual bet that giving a little bit of money to millions of low-income households will somehow solve the broadband gap.

We can, and must, do better.

Lifeline needs revolutionary, not evolutionary, change. Congress should adopt a comprehensive approach to closing the digital divide that encompasses digital literacy outreach programs and low-cost equipment plans as well as monthly service plan subsidies. The subsidy should be data-driven, and rather than arbitrarily choosing minimum download speeds, the program should define a minimum set of activities that recipients should be able to do online, and target plans that will allow recipients to do those things. Consistent with President Obama's ConnectALL initiative, this subsidy should be direct and portable: recipients should receive the subsidy directly and be able to choose how best to use this credit toward the bundle of telecommunications services that best fit their household needs.

The program should be placed on a fixed budget subject to congressional control and oversight, to increase incentives to deploy funds efficiently and reduce opportunities for fraud and waste. Finally, Congress should consider moving the program to another agency, such as the Department of Health and Human Services, that has a better understanding of poverty-related issues.

The Need to Narrow the Digital Divide

The basic tenet of universal service—that the government should assist those who cannot afford basic access to the telecommunications network—has been a cornerstone of telecommunications policy for nearly a century. One of the FCC's primary obligations is to "make available, so far as possible, to all the people of the United States . . . a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges."[1] To an economist, this policy is justified by *network effects*: the value of a network connection to a consumer generally increases as the number of people the consumer can reach on the network increases.[2] Therefore, a policy that encourages low-income consumers to subscribe to telecommunications service benefits not only those consumers, but also all other subscribers as well. Universal service also helps maximize the utility of the network for society as a whole, by improving civic participation levels, economic opportunities, and public safety.

The case for a robust universal service program is even stronger in the digital age. As more of our daily activities move online, it becomes increasingly important to make sure that low-income consumers can continue to participate in society and benefit from the information revolution. These activities include:

- **News.** Internet access lowers the cost of information, making it easier to be an informed citizen. More Americans report getting their news each week via laptop or computer (70 percent) than via traditional newspapers and magazines (61 percent).[3]
- **Commerce.** FCC Chairman Tom Wheeler notes a 2012 study showing that broadband access helps a typical consumer save $8,800 each year by providing access to bargains on goods and services.[4]
- **Jobs.** A recent study from the Council of Economic Advisers shows that young unemployed individuals who use the Internet to find jobs are re-employed 25 percent faster than those using only traditional methods.[5]
- **Education.** FCC Commissioner Jessica Rosenworcel has highlighted the role of Internet access for schoolchildren and the need to avoid a "Homework Gap" for those who lack access at home.[6]

Despite these clear benefits, almost one-third of American households lack high-speed Internet access at home. The disparity is greater when segmented by income: 95 percent of households earning $150,000 or more annually are connected, compared with only about half of households earning less than $25,000.[7] As the Internet displaces the telephone as the nation's primary telecommunications network, the case for modernizing our traditional universal service mandate to fit the 21st century is becoming increasingly strong.

Extending Lifeline Is Not the Answer

The FCC's proposed solution is to extend the existing Lifeline program to subsidize broadband access.[8] While the agency has correctly diagnosed

the problem, its proposal is unlikely to help solve it.

As an initial matter, there is no proof that the existing Lifeline telephone subsidy has any effect on telephone adoption rates. Lifeline was born in the 1980s, as a political compromise following the breakup of the Bell monopoly. During the monopoly era, Bell used cross-subsidies to cover some costs of local telephone service. After divestiture the FCC implemented a monthly per-line fee on local consumers to recover that lost revenue.[9] Concerned that this new monthly fee might harm telephone adoption rates, the agency established Lifeline to subsidize monthly service for low-income consumers, although as the GAO notes, the FCC found no evidence that this new fee would cause low-income consumers to cancel their telephone service.[10]

Currently, the program offers most eligible recipients a $9.25 subsidy for their monthly phone bills. But when pressed by the GAO, the FCC admitted that it does not know whether the Lifeline program has helped boost telephone penetration rates.[11] The agency instead pointed the GAO to independent studies that suggest that demand for telephone service is relatively insensitive to changes in price or income, even for low-income households.[12] One such study finds that only one in eight households that receive Lifeline subscribes to telephone service because of the subsidy. That suggests that 88 percent of Lifeline dollars are wasted on households at little risk of losing telephone service absent the subsidy, and the rate is higher for wireless Lifeline recipients. The GAO concluded that Lifeline "may be a rather inefficient and costly mechanism to increase telephone subscribership among low-income households."[13] At a minimum, the FCC admits that it spent $1.6 billion last year on Lifeline without any evidence that the program achieves any good.

Similarly, the agency offers no reasonable basis to conclude that extending the existing program to broadband will measurably close the low-income broadband gap. As a preliminary matter, the agency makes no effort to target only unconnected households, meaning that the agency risks replicating its existing error of spending significant resources on recipients who are not at risk of falling on the wrong side of the digital divide. Perhaps more significantly, the agency offers no reason to believe its proposal will entice unconnected households to buy Internet access. The GAO recommended that, before expanding into broadband, the FCC assess the telecommunications needs of low-income households and use the results to design a well-informed and effective broadband subsidy program.[14]

At a minimum, the FCC admits that it spent $1.6 billion last year on Lifeline without any evidence that the program achieves any good.

The FCC appears to have rejected this advice, proposing instead simply to allow recipients to use their $9.25 monthly subsidy to purchase broadband access rather than telephone service.[15] Even if one assumes without evidence that this subsidy convinces low-income households to buy telephone service, there is no logical reason to conclude that the same amount would also persuade unconnected homes to purchase Internet access, which is typically more expensive than phone service. Without conducting a study to determine the factors driving low adoption rates, the FCC cannot conclude that offering $9.25 per month to 13 million households will boost adoption rates more than offering a larger amount to a smaller number of households: for example, $46.25 per month to 2.6 million recipients, which would cost the same amount of money.

In fact, what little data the FCC has generated suggests that a small monthly subsidy is unlikely to boost broadband adoption rates. From 2012 to 2014, the agency conducted a series of broadband subsidy pilot programs. The agency estimated that 74,000 low-income consumers would receive broadband service through these trials, but only one-tenth of this number were enticed to sign up.[16] The GAO noted that insufficient sample sizes and methodological flaws in pilot design may limit the conclusions that can be drawn. But

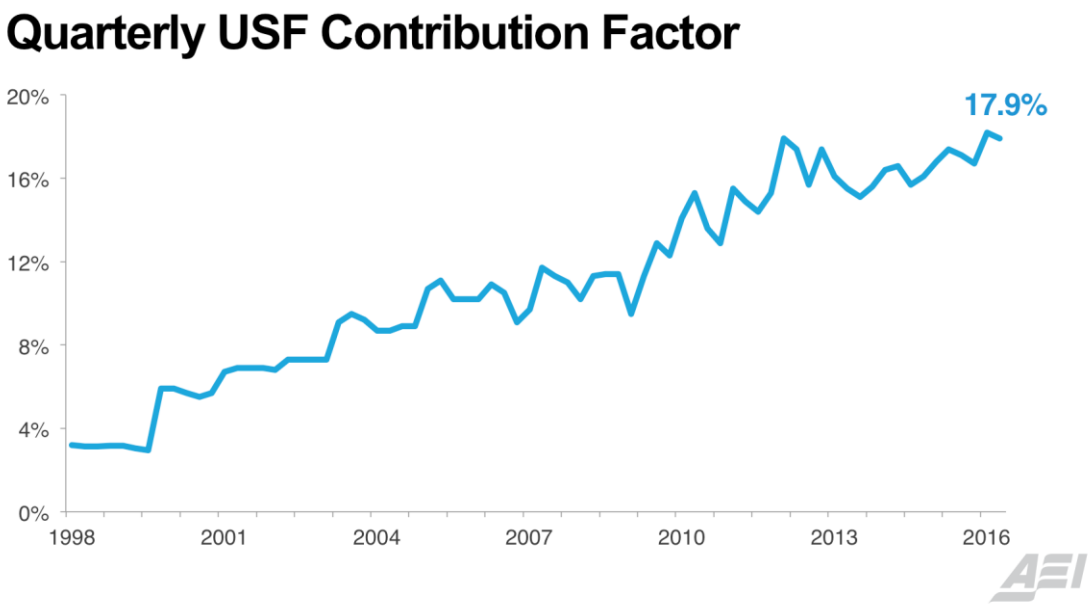
the FCC noted a preliminary finding that the highest participation rates came from those programs offering deeply discounted or free monthly rates. For example, one project offering a choice between a plan with an upfront cost and no monthly fee and a plan with a $20 monthly fee saw 100 percent of plan participants enroll in the free option.[17] An independent study of the broadband pilot data by Technology Policy Institute's Scott Wallsten similarly showed that participants were willing to trade speed for lower out-of-pocket prices.[18] These findings are consistent with the traditional Lifeline service, which saw a spike in enrollment when the FCC allowed recipients to get a free wireless plan rather than a subsidized landline service. Broadband providers may make qualifying plans available at little or no cost to Lifeline households. Comcast, for example, has offered its 10 megabits per second (Mbps) Internet Essentials plan to certain families on the school lunch program for only $9.95/month. But if the $9.25 subsidy instead goes to plans that require a significant monthly payment from the consumer as well, the data suggest that the subsidy is unlikely to convert unconnected households into broadband adopters and will instead flow primarily to homes that already have broadband service.

Moreover, the Lifeline proposal does little to address the other, potentially more significant, drivers of the low-income broadband gap. According to the latest Pew Research Center survey, only about one-third of non-broadband users cite monthly cost as the most important reason for their lack of service.[19] While this is the most commonly cited factor, it is far from the only driver cited by respondents. Moreover, for the 20 percent of Americans who have *never* had Internet access, the vast majority (70 percent) are uninterested in subscribing at any price.[20] As *Forbes* commentator Larry Downes notes, earlier Pew studies suggest that many in this group cite relevance or usability as reasons not to adopt broadband. To overcome this obstacle, a program should include digital literacy outreach and other initiatives to make Internet access more attractive and less of a mystery—initiatives that are missing in the current proposal.[21] In addition, 10 percent of Pew respondents also cited the high cost of computer equipment as a barrier to broadband adoption.[22] This highlights a significant distinction between telephone and broadband subsidy programs. Telephones are fairly inexpensive, and the market has developed tools to allow consumers to finance more expensive wireless handsets over time. But there is not a similar program in place for home computer equipment. This means that the consumer faces a potentially significant upfront cost to cross the digital divide, a factor that the current Lifeline telephone program never faced. A subsidized monthly plan is worthless to a consumer who lacks the hardware to get onto the Internet. The FCC's Lifeline proposal does little to address these other drivers, limiting its overall effectiveness at reaching and converting non-adopters.

The FCC proposal also raises significant questions regarding which services would be eligible for the subsidy. The proposal would require qualifying fixed plans to offer at least 10 Mbps download speed and a minimum of 150 gigabytes per month. This service falls short of the 25 Mbps minimum that the FCC has defined as "broadband service," meaning that the agency proposes to offer low-income consumers plans that it has determined are inadequate to meet consumer needs in other contexts. One can perhaps justify this choice by proving that 10 Mbps is sufficient to allow eligible recipients to participate meaningfully in cyberspace. But the proposal does not do so, instead simply stating that 10Mbps is what a substantial majority of consumers receive. Absent a more data-driven explanation, the inconsistency between the 10 Mbps minimum here and the 25 Mbps minimum used elsewhere raises significant questions.

Also concerning is the plan to phase out the existing, and popular, subsidy for mobile phone service. Support for mobile phone service will continue only until 2019, after which mobile plans must include a broadband component. This seems unnecessarily paternalistic. As noted earlier, a substantial majority of consumers who have never purchased broadband access are unlikely to do so at any price. One can imagine a variety of potential consumer profiles within this group, such as impoverished senior citizens who lack interest in Internet access but who value basic mobile telephone service to communicate easily with grandchildren and friends. The 2008

Figure 1

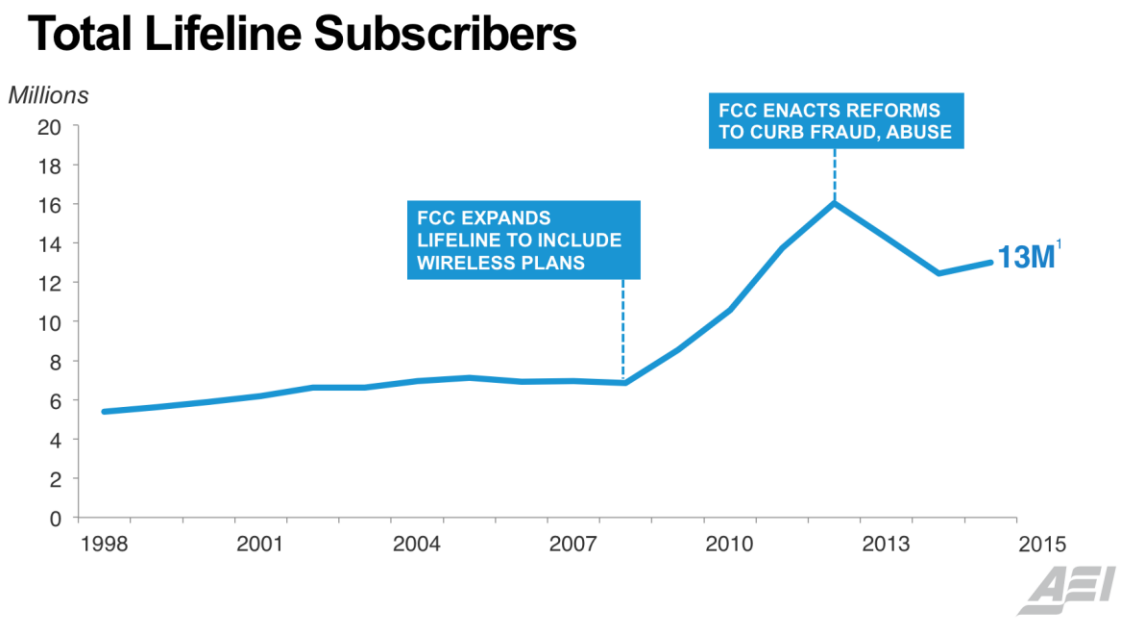


Sources: 1998–2000: Federal Communications Commission, "Trends in Telephone Service," September 2010, https://apps.fcc.gov/edocs_public/attachmatch/DOC-301823A1.pdf. 2000–2016: Universal Service Administrative Company, quarterly administrative filings to Federal Communications Commission, https://www.fcc.gov/general/contribution-factor-quarterly-filings-universal-service-fund-usf-management-support.

expansion of Lifeline to include mobile voice service was incredibly popular, helping drive a 166 percent increase in Lifeline subscribers from 2008 to 2012.[23] The GAO estimates that wireless carriers received 85 percent of all Lifeline disbursements in the third quarter of 2014.[24] These plans are popular in part because they involve little or no monthly contribution from the consumer. Replacing this standalone mobile service with a presumably more expensive bundled voice and broadband offering, while holding the subsidy constant, is likely to drive up consumer costs and reduce Lifeline participation rates at the margin.

Finally, the proposal does little to address Lifeline's longstanding structural flaws, most significantly its financial stability. In short, the proposal seeks an alarming 50 percent increase in a program that has been growing significantly in recent years, without addressing the anachronistic and unsustainable contribution mechanism that would fund this growth. Although the FCC's 2012 anti-fraud measures have reduced some Lifeline costs, the program still spent $1.6 billion in 2015, which is about double the amount spent in 2008. This runaway growth has prompted some, most prominently FCC Commissioner Mike O'Rielly, to demand that Lifeline be subjected to a hard budget to curb its astronomical growth. Yet the FCC proposes raising annual expenditures to $2.25 billion annually, indexed to inflation. The proposal suggests an annual Lifeline budget, but there appears to be little enforcement of this budgetary limit, meaning that it will likely do little to curb program growth. Lifeline, like the FCC's other universal service programs, is funded by a surcharge on interstate and international telecommunications calls (what used to be called "long-distance"), which is ultimately passed along to consumers. For the past 15 years, Universal Service Fund (USF) costs have been rising, while the revenue base is falling because people make fewer traditional long-distance calls. As a result, the USF surcharge has grown astronomically, from 3 percent in 1998 to a whopping 18.2 percent in the first quarter for 2016. A 50 percent increase in Lifeline costs will likely raise that number further, despite the growing criticism that the current level is unsustainable and deters

Figure 2



Sources: 1998–2008: Federal Communications Commission, "Trends in Telephone Service," September 2010, https://apps.fcc.gov/edocs_public/attachmatch/DOC-301823A1.pdf. 2009–2014: Universal Service Administrative Company, annual reports, 2009–2014, http://www.usac.org/about/tools/publications/annual-reports/default.aspx.

consumers from using the telecommunications networks that the program is designed to promote.

Ultimately, the FCC's proposal amounts to spending $2.25 billion or more annually to expand a troubled telephone subsidy program into cyberspace, hoping that some of this money will measurably increase low-income broadband adoption rates, but without any proof that this is likely and despite significant evidence suggesting otherwise.

Toward a Better Model

To solve the low-income broadband gap, Lifeline needs revolutionary, not evolutionary, change. The myriad difficulties with the FCC's proposal show the need for a more comprehensive approach to this problem. The remainder of this paper sketches the broad strokes of a program that is more likely to achieve meaningful reform.

First, policymakers should take a more tailored, data-driven approach to the low-income broadband adoption problem. Rather than simply offering assistance to anyone who qualifies for other forms of government assistance, policymakers should study the profile of low-income non-broadband households in particular and design an application system tailored to this segment of the population. This will reduce the risk of spending program dollars on those who would have bought Internet access anyway. The study should also identify metrics to determine just how much of a monthly subsidy eligible households would need to entice them to purchase Internet access. This would help solve the question of whether a small subsidy to a large number of recipients or a larger subsidy to fewer recipients will be more effective at reducing the broadband gap.

At the same time, the plan should involve a more comprehensive solution than Lifeline currently offers. In addition to the monthly cost subsidy, an effective broadband Lifeline program should include ways for low-income recipients to acquire computers and other equipment they need to get online. This can be done with a one-time equipment subsidy for new participants (perhaps

drawing appropriate lessons from the FCC's now-defunct Link-Up program that funded installation costs for telephone service) or by allowing low-interest financing options for participants to purchase equipment. The program should also include digital literacy outreach programs in local communities, so those who are unconvinced or uncertain about Internet use can gain a greater appreciation of the importance of connectivity to everyday life.

The program should also take an activity-based approach to defining eligible plans. Rather than arbitrarily choosing a minimum download speed from the bevy of available options, the program should identify which online activities would empower low-income consumers. This list might include access to email, news, job boards, or digital voice service to reach public safety officials. Once this list is completed, the program can estimate the minimum speed necessary to accomplish these tasks online and use this to define the target plans for the monthly subsidy. Many define broadband as 25 Mbps or more, an amount driven by estimates about the minimum speed necessary to stream high-definition video online. But it is unclear that a broadband Lifeline program should provide a subsidy large enough for low-income recipients to stream Netflix. After all, the traditional universal service program never subsidized cable subscriptions. An activity-based approach would allow the program to target its dollars more efficiently toward the goal of allowing low-income consumers to engage in a basic set of important activities online.

To avoid concerns about paternalism, the program should design the subsidy to empower consumers. The primary difficulty facing low-income consumers is lack of purchasing power. A competitively neutral, consumer-empowering subsidy would solve this problem by increasing the purchasing power of eligible recipients with limited strings attached. In the words of President Obama's ConnectALL initiative, the subsidy should be "direct and portable." One potential solution would be to offer consumers a voucher that can be redeemed for a variety of services. The voucher should be set at the amount necessary to subsidize a basic broadband plan that offers at least the necessary minimum speed. But the consumer should have the freedom to use the voucher to purchase a (presumably less expensive) voice-only plan or as a credit toward a larger bundle of telecommunications services, if the consumer is willing to pay more out-of-pocket.[25] This approach would be a more market-based approach to universal service, empowering low-income consumers with greater purchasing power to influence providers to compete for their attention. This would also bring the subsidy program in line with other government benefit programs, such as SNAP and Medicaid, that seek to increase purchasing power and market freedom of low-income recipients.

Finally, the program should be administered very differently than the current model. Rather than funding it off-budget through a shaky and unsustainable surcharge mechanism, Congress should make the broadband subsidy program a line item in the federal budget, subject to a hard cap on annual expenditures. This would make the program more transparent and subject to greater congressional oversight to discourage the fraud, abuse, and waste that until recently marked the Lifeline program. A firm annual budget tied to clear metrics such as adoption rates would encourage program managers to spend the money efficiently, in ways that maximize the likelihood that these annual expenditures will actually reduce the digital divide. Congress should also consider shifting oversight of the program from the Federal Communications Commission to another agency, such as the Department of Health and Human Services, that better understands the issues facing those in poverty. It may ultimately decide not to shift the program, but this decision should be based on a rational assessment of the FCC's institutional strengths compared with other potential departments.

Conclusion

The Federal Communications Commission should be credited for shining a spotlight on an important problem in need of urgent attention, but it has not shown that its proposal is likely to solve the problem. Rather than extending a flawed telephone-era subsidy program into cyberspace—an exercise in pounding the metaphorical square peg into a round hole—Congress should design a more comprehensive, data-driven and market-based approach to the

low-income broadband gap. This approach is more likely to narrow the digital divide and equip low-income consumers to take advantage of the many and growing opportunities made available by the digital revolution.

About the Author

Daniel A. Lyons is a visiting scholar in Center for Internet, Communications, and Technology at the American Enterprise Institute and an associate professor of law at Boston College Law School.

Notes

1. 47 U.S.C. § 151.

2. See, for example, Steve G. Parsons and James Bixby, "Universal Service in the United States: A Focus on Mobile Communications," *Federal Communications Law Journal* 62, no. 119 (2010): 135–136, http://www.fclj. org/wp-content/uploads/2013/ 01/10-PARSONS_ FINAL.pdf.

3. American Press Institute, "The Personal News Cycle: How Americans Choose to Get Their News," March 17, 2014, https://www.americanpressinstitute.org/publications/reports/survey-research/how-americans-get-news/.

4. See Tom Wheeler, "A Lifeline for Low-Income Americans," Federal Communications Commission, May 28, 2015, https://www.fcc.gov/news-events/blog/2015/ 05/28/lifeline-low-income-americans.

5. See Council of Economic Advisers, "The Digital Divide and Economic Benefits of Broadband Access," *Issue Brief*, March 2016, https://www.whitehouse.gov/sites/default/files/page/files/20160308_broadband_cea_ issue_brief.pdf, citing Peter Kuhn and Hani Mansour, "Is Internet Job Search Still Ineffective?" Institute for the Study of Labor (Bonn), September 2011, http://ftp.iza.org/dp5955.pdf.

6. See Jessica Rosenworcel, "How to Close the 'Homework Gap,'" *Miami Herald*, December 5, 2014, http://www.miamiherald.com/opinion/op-ed/article4300806.html.

7. See "Lifeline and Link Up Reform and Modernization," 30 FCC Rcd. 7818, 7822, 7829, and n.232 (2015).

8. See Federal Communications Commission, "Fact Sheet on Lifeline Modernization Proposal," March 8, 2016, https://www.fcc.gov/document/fact-sheet-lifeline-modernization-proposal.

9. US Government Accountability Office, "Improved Management Can Enhance FCC Decision Making for the Universal Service Fund Low-Income Program," GAO-11-11, October 28, 2010, 5, http://www.gao.gov/products/GAO-11-11.

10. Ibid.

11. See US Government Accountability Office, "FCC Should Evaluate the Efficiency and Effectiveness of the Lifeline Program," GAO-15-335, March 24, 2015, 14, http://www.gao.gov/products/GAO-15-335.

12. See, for example, Olga Ukhaneva, "Universal Service in a Wireless World," Social Science Research Network, November 17, 2015, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2430713; and Daniel A. Ackerberg et al., "Estimating the Impact of Low-Income Universal Service Programs," CES-13-33, US Census Bureau, Center for Economic Studies, June 2013, http://www2.census.gov/ces/wp/2013/CES-WP-13-33.pdf.

13. US Government Accountability Office, "FCC Should Evaluate," 14.

14. US Government Accountability Office, "Improved Management," 42.

15. See Federal Communications Commission, "Fact Sheet on Lifeline Modernization Proposal."

16. See US Government Accountability Office, "FCC Should Evaluate," 33.

17. Ibid., 33–34.

18. Scott Wallsten, "Learning from The FCC's Lifeline Broadband Pilot Projects," Technology Policy Institute, March 2016, https://techpolicyinstitute.org/wp-content/uploads/2016/03/Wallsten_Learning-from-the-FCCs-Lifeline-Broadband-Pilot-Projects.pdf.

19. See John B. Horrigan and Maeve Duggan, "Home Broadband 2015," Pew Research Center, December 21, 2015, 4, http://www.pewinternet.org/files/2015/12/ Broadband-adoption-full.pdf.

20. Ibid., 8. See Larry Downes, "Smartphones Are Completing the Broadband Revolution," *Forbes*,

December 23, 2015, http://www.cnet.com/news/broadband-adoption-shifts-to-mobile.

21. See Downes, "Smartphones Are Completing the Broadband Revolution."

22. Horrigan and Duggan, "Home Broadband 2015," 16.

23. US Government Accountability Office, "FCC Should Evaluate," 24.

24. Ibid., 25.

25. See Daniel Lyons, "Reforming the Universal Service Fund for the Digital Age," chap. 7 in *Communications Law and Policy in the Digital Age*, edited by Randolph May (Durham, NC: Carolina Academic Press, 2012), http://papers.ssrn.com/sol3/papers.cfm?abstract_id= 2321881.